

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-208320

(43)Date of publication of application : 08.08.1995

(51)Int.Cl. F03D 3/04

F03D 1/06

F03D 3/02

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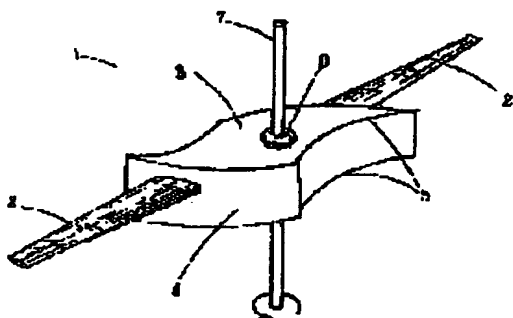
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## (54) VERTICAL SHAFT WIND MILL TO BE LAMINATED ON MULTISTOREY TOWER

### (57)Abstract:

**PURPOSE:** To improve an operation rate per year and attempt starting by weak wind for effectively utilizing wind force energy most intimately and improving the performance of a wind mill to be laminated on a multistorey tower, in the wind mill for taking out electric energy from wind force energy effectively.

**CONSTITUTION:** A vertical shaft wind mill is constituted by a lift generating main wing 2 whose aerofoil cross sectional shape is formed in a symmetric aerofoil shape and an auxiliary wing 5, and the auxiliary wing 5 is constituted as the vertical shaft wind mill with a hybrid wing to which a savonius shaped drag shaped wing



which is constituted by the wing receiving plate 3 and a side plate 4 is applied.

## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. \*\*\*\* shows the word which can not be translated.

3. In the drawings, any words are not translated.

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## CLAIMS

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[Claim(s)]

[Claim 1] In the configuration of the wind-mill aerofoil in the vertical-axes wind mill for laminating loading to an upper-layers tower The main plane 2 of the lift form aerofoil which formed the shape of a wing section in the symmetry profile, and was made into the diameter of rotation actuation of a wind mill, The vertical-axes wind mill for laminating loading to the upper-layers tower characterized by considering as the aileron 5 which was constituted by \*\*\*\*\* 3 and the side plate 4 which were equipped up and down, and was formed in the reaction form aerofoil, and the vertical-axes wind

mill constituted by the above with the main plane 2 and the aileron 5

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the vertical-axes wind mill for laminating loading at the upper-layers tower in the wind-mill power plant for transforming wind-force energy into electrical energy.

[0002]

[Description of the Prior Art] In the wind mill for laminating loading to an upper-layers tower And (H08-29213800212) the sail wing wind mill which can be set is a wind mill of the method of operating by right-and-left \*\*\*\* movement of a sail in response to the wind pressure of an air current. a patent application (H06-29213800210) — and (H07-29213800211) — The following (H10-29213800214) equips a duct blade at the tip of a main plane. It is the wind mill for laminating loading of generating lift by change of the include angle of the carrier style of the structure of the duct, i.e., a resistance include angle. The wind mill of the hybrid system which used the blade of a reaction form as the aileron at the main plane of the lift form of this invention is a wind mill of another method which completely differed in effect, and the wind mill which equipped the main plane of a lift form of this invention with the aileron of a reaction form did not look at an example to the conventional wind-mill method as a wind mill for laminating loading.

[0003]

[Problem(s) to be Solved by the Invention] The engine performance is determined by the form and configuration of a wind-mill blade whose base of the wind-mill engine performance is an energy inverter. In the propeller mold wind mill by which abbreviation completion is also technically carried out as a high performance wind mill Since effectiveness is inferior to a propeller form wind mill in the wind mill of a reaction form conventionally in view of being in the condition of controlling and carrying out the rotational frequency of a wind mill to about 45 rotation extent in 1 minute in order to make variation by the irregularity of a wind regularity In order to be in the condition which is not used as a wind mill for wind power and to use wind-force energy effectively in this invention The description that the starting nature of the wind-mill engine performance and running torque are large is improved, and in order to conquer the defect in which the rotational speed of a wind mill is slow, it has the technical problem what kind of means is adopted.

[0004]

[Means for Solving the Problem] In order to conquer the defect in which the rotational speed of a reaction form wind mill is slow, the wind mill constituted with the main plane 2 which formed the airfoil profile in the symmetry profile and was made into the rotation diameter of a wind mill, and the aileron 5 constituted by up-and-down \*\*\*\*\* 3 and an up-and-down side plate 4 was combined with the aerofoil bond part 6, and it combined with the wind-mill revolving shaft 7. Next, the wind-mill revolving shaft 7 rotated the generator through power transfer system \*\* (with no drawing), and was constituted as a system of taking out power.

[0005]

[Function] By having formed the shape of main-plane 2 wing section in the symmetry profile, it becomes the operation which generates the lift in wind-mill rotation actuation. Next, it becomes the operation which raises the starting nature of the wind-mill engine performance by having made it the form structure which constitutes the form of the aileron 5 with which the inner circumference section was equipped in \*\*\*\*\* 3 and a side plate 4, and carries out the style of the air current of a carrier efficiently. Next, it considered as the operation which forms a main plane 2 in a periphery side for a long time, and makes rotational speed accelerate using the centrifugal force under rotation actuation.

[0006] Next, drawing 2 explains the working principle of this wind mill. Arrow-head I is taken as wind direction. The wind shall blow from a drawing and the upper part. The hand of cut of a wind mill is made into the direction of counterclockwise. Air-current RO acts on the side plate 4 of an aileron 5, according to the drawing, it acts on the left-hand side side plate 4, and a side plate 4 operates caudad in response to a wind pressure, and serves as counterclockwise rotation actuation one after another. That is, it is the actuation method of the Savonius windmill which is the representation of the conventional reaction form, and is as technical [ well-known ]. Next, it becomes the operation which a centrifugal force occurs at the tip of a main plane 2, and accelerates rotation of a blade during rotation actuation.

[0007]

[Example] A drawing explains the example of this invention. Drawing 1 is the perspective view of an example having shown the configuration of the wind mill of this invention. An aileron 5 is constituted by up-and-down \*\*\*\*\* 3 and an up-and-down side plate 4, is combined and attached in the aerofoil bond part 6, and is constituted as a wind-mill blade combined with the wind-mill revolving shaft 7.

[0008] Drawing 3 is the cross-section schematic drawing of the example which carried out laminating loading of the wind mill of this invention at the upper-layers

tower. On the foundation, it is the configuration of a column 10 on the beam 9 on building construction, and the generation-of-electrical-energy accessory compartment 11 is surrounded on the beam 9 in the periphery at the leg 8 of steel construction, and at its top. The wind-mill room 12 which equipped the wind mill 1 is put on the generation-of-electrical-energy accessory compartment 11, and it is \*\*. It is drawing having shown the example which carried out laminating loading of the generation-of-electrical-energy accessory compartment 11 and the wind-mill room 12 one after another. That is, the wind mill of this invention is developed as a wind mill for laminating loading at an upper-layers tower.

[0009]

[Effect of the Invention] As mentioned above, as explained, the wind mill of this invention is the wind-mill blade used as the hybrid aerofoil constituted with main-plane 2 aileron 5, and it has the function which raises the starting nature of the wind-mill engine performance also in a breeze zone by having adopted the aileron of a reaction form for technical-problem conquest of the starting nature in the range where the area of the carrier style is narrow for the structure of installing a wind mill in the interior of a room of the construction structure. Since it has the engine performance which raises the annual operating ratio of the wind mill which are the conditions of a deployment of a wind force by that, in the condition of having carried out laminating loading, a function is demonstrated to an upper-layers tower.

[Brief Description of the Drawings]

[Drawing 1] \*\*, the perspective view having shown the example of the wind mill of this invention

[Drawing 2] \*\*, the explanatory view of operation having shown the working principle of the wind mill of this invention

[Drawing 3] \*\*, operation cross-section schematic drawing which carried out laminating loading of the wind mill of this invention at the upper-layers tower

[Description of Notations]

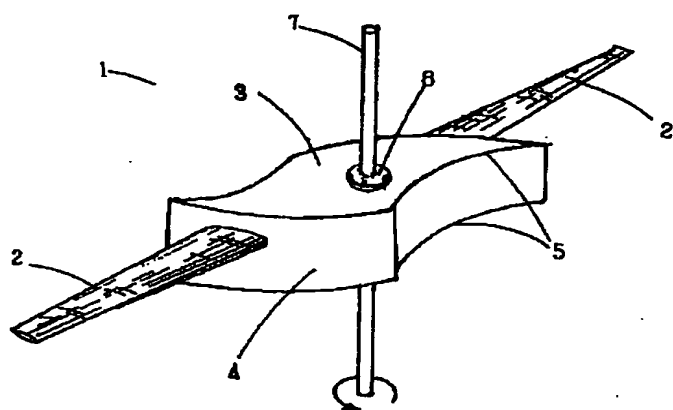
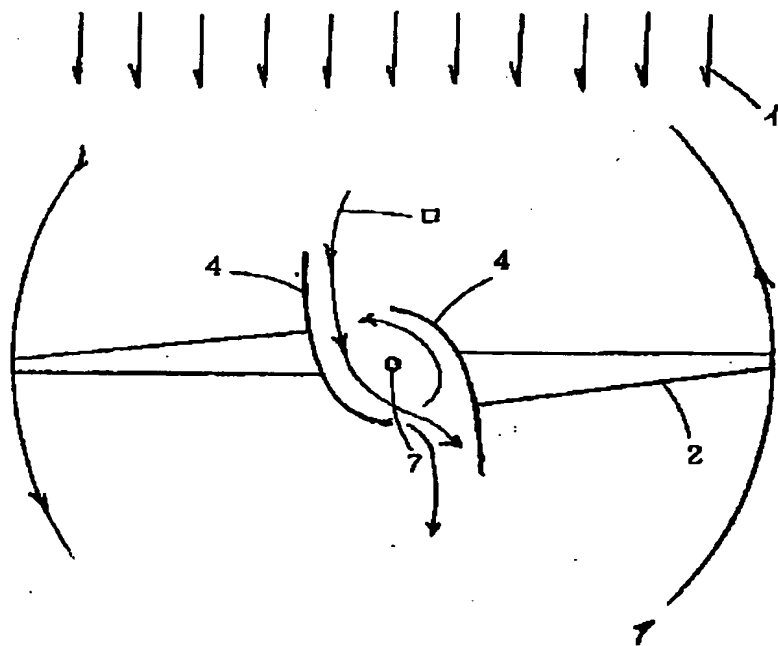
1 is - wind mill. 2 is - main plane. 3 is - \*\*\*\*\*.

4 is - side plate. 5 is - aileron. 6 is - aerofoil bond part.

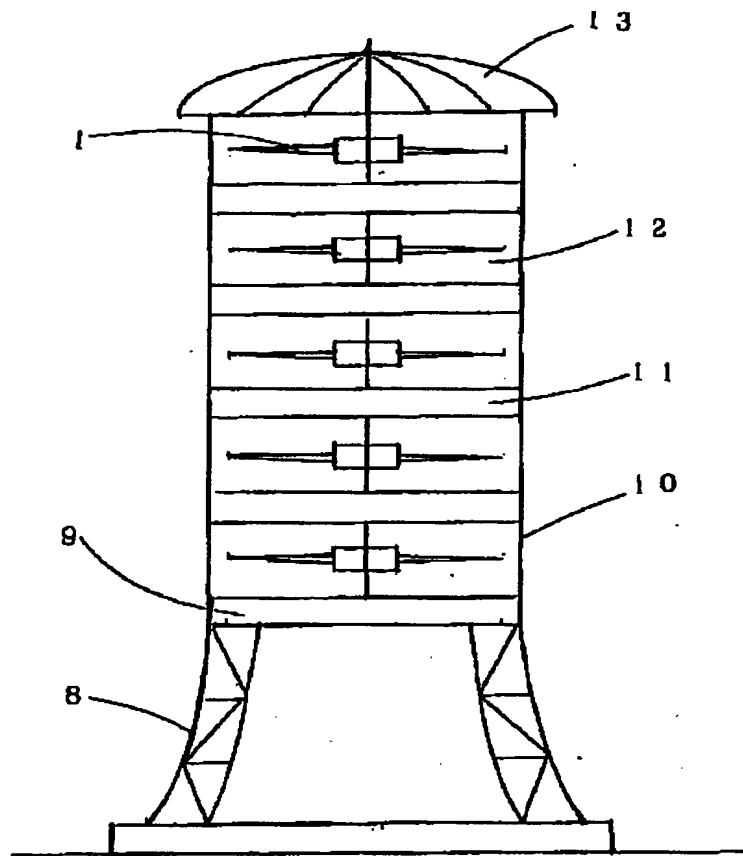
7 is - wind-mill revolving shaft. 8 is - leg. 9 is - beam.

10 is - column. 11 is - generation-of-electrical-energy accessory compartment. 12 is - wind-mill room.

13 is - roof.

[Drawing 1][Drawing 2]

[Drawing 3]



(51) Int.Cl.*	識別記号	庁内整理番号	F I	技術表示箇所
F 0 3 D	3/04	A 7214-3H		
	1/06	A 7214-3H		
	3/02	B 7214-3H		

審査請求 未請求 請求項の数 1 書面 (全 3 頁)

(21) 出願番号 特願平6-30774

(22) 出願日 平成6年(1994)1月17日

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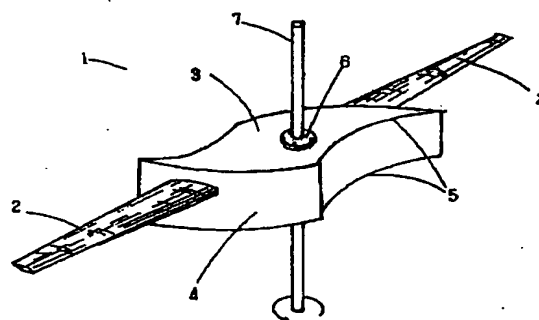
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1号棟26号

(54) 【発明の名称】 高層タワーに積層搭載用の垂直軸風車

(57) 【要約】 (修正有)

【目的】 風力エネルギーより効率よく電気エネルギーを取り出すための風車に関するもので、風力エネルギーを最も身近に効率よく利用するために、高層タワーに積層搭載用の風車の性能向上のために、風車の年間稼働率と弱風起動図る。

【構成】 翼断面形状を対称翼形に形成した揚力形の主翼2と、補助翼5によって構成し、その補助翼を受風板3と側板4によって構成されたサボニウス形の抗力形翼を応用したハイブリット翼の垂直軸風車に構成した。





## 【特許請求の範囲】

【請求項 1】高層タワーに積層搭載用の垂直軸風車における風車翼の構成において、翼断面形状を対称翼形に形成して、風車の回転作動の直径とした揚力形翼の主翼 2 と、上下に装備された受風板 3 と側板 4 によって構成され抗力形翼に形成された補助翼 5、以上によって主翼 2 と補助翼 5 によって構成された垂直軸風車としたことを特徴とする、高層タワーに積層搭載用の垂直軸風車

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】この発明は、風力エネルギーを電気エネルギーに変換するための風車発電装置における高層タワーに積層搭載用の垂直軸風車に関するものである。

## 【0002】

【従来の技術】高層タワーに積層搭載用の風車において、特許願（H06-29213800210）及び（H07-29213800211）及び（H08-29213800212）におけるセイルウィング風車は気流の風圧を受けてセイルの左右往復運動によって作動するという方式の風車であり、次の（H10-29213800214）は主翼の先端にダクトブレードを装備して、そのダクトの構造の受風角度すなわち抵抗角度の変化によって揚力を発生させるという積層搭載用の風車であり、本発明の揚力形の主翼に抗力形のブレードを補助翼にしたハイブリッド方式の風車とは全く趣を異にした別方式の風車であり、本発明の、揚力形的主翼に抗力形の補助翼を装備した風車は積層搭載用の風車としては、従来の風車方式に例を見なかった。

## 【0003】

【発明が解決しようとする課題】風車性能の基本は、エネルギー変換装置である風車ブレードの形体と構成によって性能は決定される。高性能風車として技術的にも略完成されているプロペラ型風車においては、風の不規則性によるバラツキを一定にするために風車の回転数を一分間に約 4.5 回転程度に制御して実施している状態であることに鑑み、従来、抗力形の風車はプロペラ形風車より効率が劣るために、風力発電用の風車としては利用されていない状態であり、本発明においては風力エネルギーを有効に利用するために、風車性能の起動性と回転トルクの大きいという特徴を見直して、風車の回転速度の遅いという欠陥を克服するためにどのような手段を講ずるかという課題を有する。

## 【0004】

【課題を解決するための手段】抗力形風車の回転速度の遅いという欠陥を克服するために、翼断面を対称翼形に形成して風車の回転直径とした主翼 2 と、上下の受風板 3 と側板 4 によって構成された補助翼 5 によって構成された風車を、翼結合部 6 に結合して風車回転軸 7 に結合した。次に風車回転軸 7 は動力伝達系統（図面なし）を

介して発電機を回転させて電力を取り出すというシステムとして構成した。

## 【0005】

【作用】主翼 2 翼断面形状を対称翼形に形成したことによって、風車回転作動における揚力を発生させる作用となる。次に内周部に装備した補助翼 5 の形体を、受風板 3 と側板 4 に構成して気流を効率よく受風する形体構造にしたことにより、風車性能の起動性を向上させる作用となる。次に主翼 2 を外周側に長く形成して回転作動中の遠心力を利用して回転速度を増速させる作用とした。

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【0006】次に、本風車の作動原理を図 2 によって説明する。矢印イは、風向とする。図面、上方より風が吹いているものとする。風車の回転方向は反時計回りの方向とする。気流口は、補助翼 5 の側板 4 に作用して、図面によれば左側の側板 4 に作用し、側板 4 は風圧を受けて下方に作動して次々と、反時計回りの回転作動となる。すなわち従来の抗力形の代表であるサボニウス風車の作動方式であり公知の技術通りである。次に回転作動中に主翼 2 の先端に遠心力が発生してブレードの回転を増速する作用となる。

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## 【0007】

【実施例】本発明の実施例を図面によって説明する。図 1 は本発明の風車の構成を示した実施例の斜視図である。補助翼 5 は上下の受風板 3 と側板 4 によって構成され翼結合部 6 に結合して取り付けられて、風車回転軸 7 に結合された風車ブレードとして構成されている。

【0008】図 3 は、本発明の風車を高層タワーに積層搭載した実施例の断面略図である。基礎の上に鉄骨構造の脚部 8、その上に建築構造上の梁 9 の上に柱 10 の構成であり、発電装置室 11 は外周を梁 9 に囲まれている。発電装置室 11 の上に風車 1 を装備した風車室 12 を乗せ、発電装置室 11 と風車室 12 を次々と積層搭載した実施例を示した図である。すなわち本発明の風車は高層タワーに積層搭載用の風車として開発されたものである。

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## 【0009】

【発明の効果】以上、説明したように本発明の風車は主翼 2 補助翼 5 によって構成されたハイブリッド翼とした風車ブレードであり、建築構造体の室内に風車を設置する構造のため、受風面積が狭い範囲における起動性の課題克服のために、抗力形の補助翼を採用したことによって弱風地帯においても、風車性能の起動性を向上させる機能を有する。そのことによって風力の有効利用の条件である風車の年間稼働率を高める性能を有するために、高層タワーに積層搭載した状態において機能を発揮する。

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## 【図面の簡単な説明】

【図 1】は、本発明の風車の実施例を示した斜視図

【図 2】は、本発明の風車の作動原理を示した動作説明

50 図

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【図3】は、本発明の風車を高層タワーに積層搭載した実施断面略図

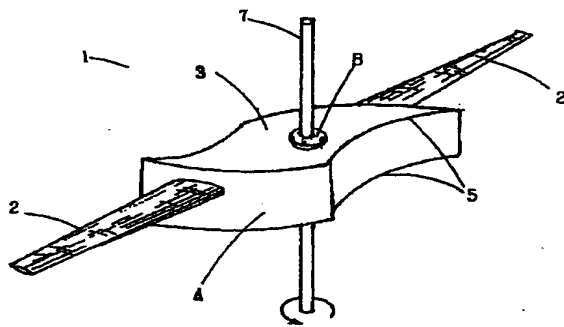
【符号の説明】

1は—風車 2は—主翼 3は—受風板  
4は—側板 5は—補助翼 6は—翼結合

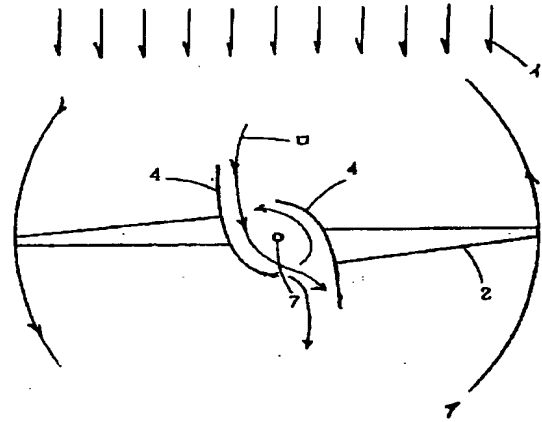
部

7は—風車回転軸 8は—脚部 9は—梁  
10は—柱 11は—発電装置室 12は—風車室  
13は—屋根

【図1】



【図2】



【図3】

